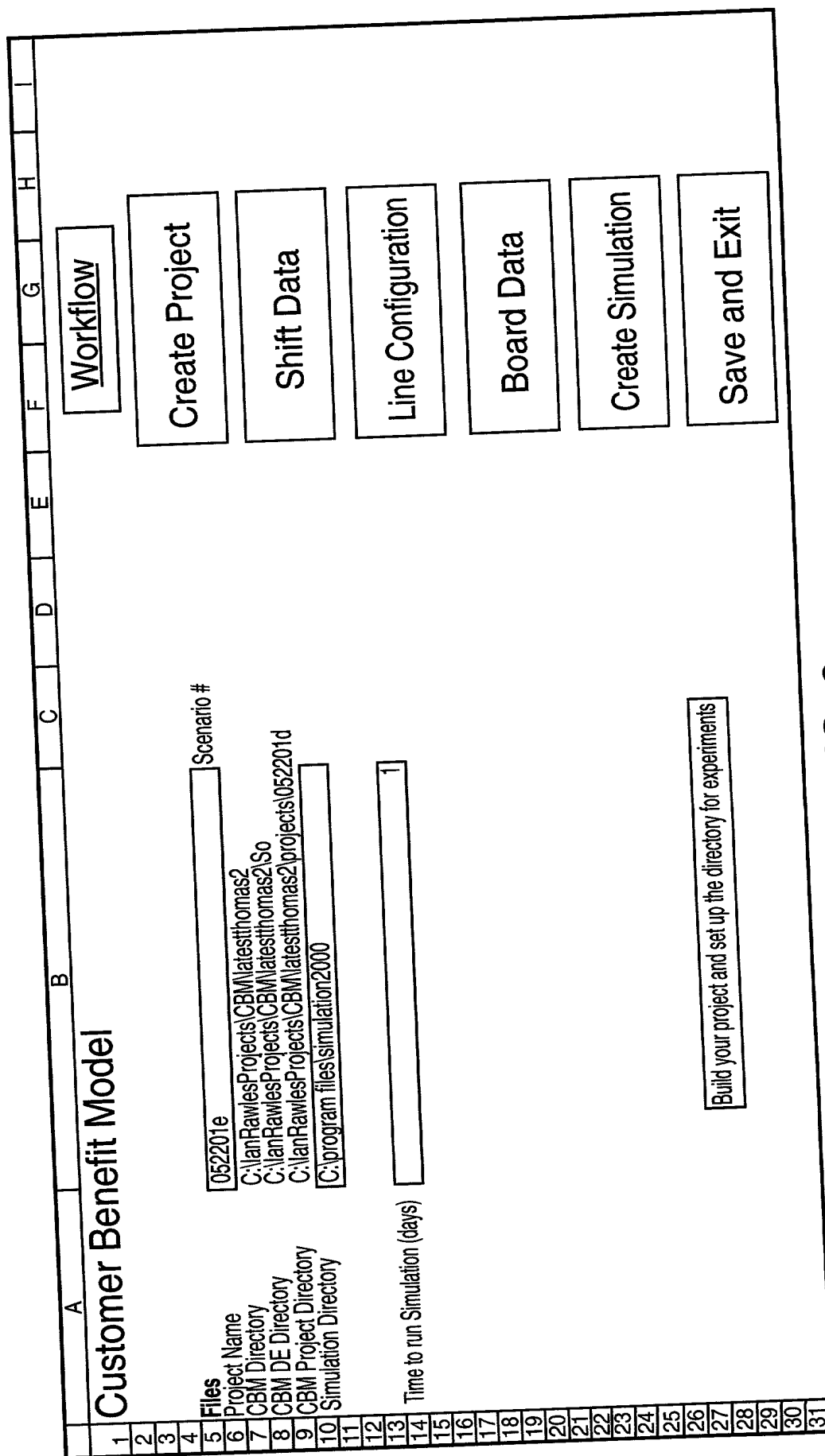


FIG. 1



Name				Size	Type	Date & Time
1				550KB	Microsoft Excel-Tab	16:05:01 13:21
CBM.xls				550KB	Microsoft Excel-Tab	16:05:01 13:03
CBM.Reports.xls				550KB	Microsoft Excel-Tab	16:05:01 13:07
CBM.transfer.xls				550KB	Microsoft Excel-Tab	16:05:01 13:08

Desktop

My Computer

Diskette A

(C:)

(D:)

Data

Recycler

Tmm_XXXX

CBA Calculator

CTM

COO

Pricing

S.G.S.

Sales Training

SIPLACE CBM

Projects

Test 2001-05-16-01

1

Test 1

Test 2

Test 3

Test 4

So

SIPLACE CEM ARCHIVE

FIG. 3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
					Main																
1																					
2	Shift Schedule				SHIFT 1																
3					SHIFT 2																
4	Monday	14	7:00	7:00	7:00	12:00	13:00	13:00	13:00	13:00	13:00	15:00	15:00	15:00	15:00	20:00	21:00	21:00	21:00	23:00	23:00
5	Tuesday	14	7:00	7:00	7:00	12:00	13:00	13:00	13:00	13:00	13:00	15:00	15:00	15:00	15:00	20:00	21:00	21:00	21:00	23:00	23:00
6	Wednesday	14	7:00	7:00	7:00	12:00	13:00	13:00	13:00	13:00	13:00	15:00	15:00	15:00	15:00	20:00	21:00	21:00	21:00	23:00	23:00
7	Thursday	14	7:00	7:00	7:00	12:00	13:00	13:00	13:00	13:00	13:00	15:00	15:00	15:00	15:00	20:00	21:00	21:00	21:00	23:00	23:00
8	Friday	14	7:00	7:00	7:00	12:00	13:00	13:00	13:00	13:00	13:00	15:00	15:00	15:00	15:00	20:00	21:00	21:00	21:00	23:00	23:00
9	Saturday	14	7:00	7:00	7:00	12:00	13:00	13:00	13:00	13:00	13:00	15:00	15:00	15:00	15:00	20:00	21:00	21:00	21:00	23:00	23:00
10	Sunday	14	7:00	7:00	7:00	12:00	13:00	13:00	13:00	13:00	13:00	15:00	15:00	15:00	15:00	20:00	21:00	21:00	21:00	23:00	23:00
11	shifts apply for model	0	not working																		
12	initial Offset	1																			
13	Only lunch break applies	0																			
14	Breaks apply for machines	0																			
15	Weeks per year	50																			
16	Days off per year	10																			
17	Hours per day	24.00																			
18	Hours per day/average	23.31																			
19	Hours per week	168.00																			
20	Hours per week/average	153.20																			
21	Hours per year	8160.00																			
22	#	1																			
23	1	2																			
24	2	3																			
25	3	4																			
26	4	5																			
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371	349	350																			

FIG. 4

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
31				12	7:00			12:00	13:00			15:00	15:00	15:00	20:00	21:00	20:00	21:00	3:00	23:00	23:00
32				13	7:00	8:00	8:15	12:00	12:30	15:00	15:15	19:30	19:30	20:00	20:15	0:00	0:30	3:00	3:15	7:00	23:00
33				14	7:00			12:00	13:00			15:00	15:00	15:00	20:00	21:00	20:00	21:00	23:00	23:00	23:00
34				15																	
35				16																	
36				17																	
37				18																	
38				19																	
39				20																	
40				21																	
41				22																	
42				23																	

FIG. 4A

	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
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FIG. 4B

	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
31			4:00	5:00			7:00	→ Customer 1												
32								→ Customer 2												
33			4:00	5:00			7:00	→ Customer 3												
34								→ Customer 4												
35																				
36																				
37																				
38																				
39																				
40																				
41																				
42																				

FIG. 4C

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S												
Line Configuration																			Insert			Delete			Database			Main		
																			Return to the Main page											
1	Insert				# of process cells		transport system		assists(min/min)		maintenance (h/min) shift		failure (h/min) level 1		grafic		month		maintenan qu											
2	row						SID- Lane		MTBA MTTR		MTBA MTTR		MTBF MTTR		X		MTBM MTTR		MTBM											
3	delete row						0		60 1		0 0		0 0		100		680		4080											
4					0		1		60 1		0 0		0 0		200		680		4080											
5					0		1		60 1		0 0		0 0																	
6	7300 Buffer				0		1		60 1		0 0		0 0																	
7	7511 Conveyor 1060				0		1		60 1		0 0		0 0																	
8																														
9																														
10																														
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32																														
33																														
34																														

FIG. 5

[illegible]

	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1												
2												
3	e (h / min)		year		failure (h / min)		level 3					
4	rier				level 2				gratic			
5	MTTM	MTBM	MTTM	MTBF	MTTR	MTBF	MTTR	length	offset	Witness Module Single Lane		Dual
9	0	8160	0	0	0	0	0	100	0	Buffers Conv2_1		0 Conv2_2
10	0	8160	0	0	0	0	0	0	0	B1 conv5_2001		

5

	AU	AV	AW	AX	AY	AZ
1						
2						Bare Board Loader
3						Buffer
4						Conveyor 1060
5						Conveyor 1590
9						Conveyor 2380
10						F4 x 2 / SPL
11						F4 x 3 / SPL
12						F5
13						F5 x 2 / SPL
14						F5 x 3 / SPL
15						Flip Station 180
16						HS-50
17						HS-50 x 2 / SPL
18						HS-50 x 3 / SPL
19						Last Lift
20						Magazine Buffer MB100
21						Magazine Buffer MB50
22						Magazine Loader ML02
23						Magazine Loader ML05
24						Magazine Unloader MLJ02
25						Magazine Unloader MLJ05
26						Printer pro-flow
27						Printer pro-flow temp control
28						Printer squeegee operation
29						Printer squeegee operation temp control
30						RX 261
31						RX 262
32						RX 331
33						RX 332
34						RX 411
						RX 412

FIG. 5B

	AU	AV	AW	AX	AY	AZ
35	S-20 S-23 S-25 Shuttle-1 lane to 2 lane Shuttle-2 lane to 1 lane Telescopic Gate TG Turn Station TS					
36						
37						
38						
39						
40						
41						

FIG. 5C

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
<div>Line Configuration</div> <div>InsertDeleteDatabaseMain</div> <div>Return to the Main page</div>																				
1																				
2	insert																			
3	row																			
4	delete row																			
5																				
6																				
7																				
8																				
9	1	7300																		
10	2	7511																		
11																				
12																				
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33																				
34																				

# of process cells				transport system				assists(min/min)		maintenance (h/min) shift				failure (h/min) level 1		grafic		month		maintenan qu	
SID-Lane		synch		asynch		MTBA	MTTR	MTBA	MTTR	MTBM	MTTR	MTBF	MTTR	MTBM	MTTR	X	offset	MTBM	MTTR	MTBM	MTTR
0	0	0	0	0	0	60	1	0	0	163.2	0	0	0	0	100	0	680	0	4080		
0	1	1	1	1	1	60	1	0	0	163.2	0	0	0	0	200	0	680	0	4080		

FIG. 6

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1																		
2																		
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30																		
31																		
32																		
F4																		
Bare Board Loader																		
Buffer																		
Conveyor 1060																		
Conveyor 1590																		
Conveyor 2380																		
Conveyor 530																		
Conveyor 790																		
7580																		
7300																		
7511																		
7521																		
7531																		
7501																		
7541																		
1040																		
Database																		
Line																		
assists (min / min)																		
MTBF																		
MTTR																		
level 1																		
MTBF																		
MTTR																		
level 2																		
MTBF																		
MTTR																		
failure (h / min)																		
level 1																		
MTBF																		
MTTR																		
level 2																		
MTBF																		
MTTR																		
shift																		
MTBM																		
MTTM																		
weekly																		
MTBM																		
MTTM																		
mo																		
MTBM																		
MTTM																		
maintenan																		

FIG. 7

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
33	F4 x 2/SPL	1042	1	1	1	60	1						450			163.20		680.00
34	F4 x 3/SPL	1043	1	1	1	60	1						875			163.20		680.00
35	F5	1050	1	1	1	60	1						200			163.20		680.00
36	F5 x 2/SPL	1052	1	1	1	60	1						450			163.20		680.00
37	F5 x 3/SPL	1053	1	1	1	60	1						875			163.20		680.00
38	Flip Station 180	7580	1	1	1	60	1						200			163.20		680.00
39	HS-50	1500	1	1	1	60	1						400			163.20		680.00
40	HS-50 x 2/SPL	1502	1	1	1	60	1						850			163.20		680.00
41	HS-50 x 3/SPL	1503	1	1	1	60	1						1250			163.20		680.00
42	Last Lift	7500	0	0	0	60	1						700			163.20		680.00
43	Magazine Buffer MB100	7320	0	0	0	60	1						100			163.20		680.00
44	Magazine Buffer MB50	7310	0	0	0	60	1						100			163.20		680.00
45	Magazine Loader ML02	7600	1	1	1	60	1						200			163.20		680.00
46	Magazine Loader ML05	7610	1	1	1	60	1						200			163.20		680.00
47	Magazine Unloader MU02	7601	1	1	1	60	1						200			163.20		680.00
48	Magazine Unloader MU05	7611	1	1	1	60	1						200			163.20		680.00
49	Printer pro-flow	9003	1	1	1	60	1						200			163.20		680.00
50	Printer pro-flow temp control	9004	1	1	1	60	1						200			163.20		680.00
51	Printer squeegee operation	9001	1	1	1	60	1						200			163.20		680.00
52	Printer squeegee operation temp control	9002	1	1	1	60	1						200			163.20		680.00
53	RX 261	8001	1	1	1	60	1						700			163.20		680.00
54	RX 262	8002	1	1	1	60	1						700			163.20		680.00
55	RX 331	8003	1	1	1	60	1						700			163.20		680.00
56	RX 332	8004	1	1	1	60	1						700			163.20		680.00
57	RX 411	8005	1	1	1	60	1						700			163.20		680.00
58	RX 412	8006	1	1	1	60	1						700			163.20		680.00
59	S-20	1200	1	1	1	60	1						200			163.20		680.00
60	S-23	1230	1	1	1	60	1						200			163.20		680.00
61	S-25	1250	1	1	1	60	1						200			163.20		680.00
62	Shuttle - 1 lane to 2 lane	7100	0	0	0	60	1						100			163.20		680.00
63	Shuttle - 2 lane to 1 lane	7200	0	0	0	60	1						100			163.20		680.00
64	Telescopic Gate TG	7550	1	1	1	60	1						150			163.20		680.00
65	Turn Station TS	7570	1	1	1	60	1						200			163.20		680.00
66																163.20		680.00
67																163.20		680.00
68																163.20		680.00

FIG. 7A

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
33	F4 x 2 / SPL	1042	1	1	2	60	1									163.20		680.00
34	F4 x 3 / SPL	1043	1	1	3	60	1									163.20		680.00
35	F5	1050	1	1	1	60	1									163.20		680.00
36	F5 x 2 / SPL	1052	1	1	2	60	1									163.20		680.00
37	F5 x 3 / SPL	1053	1	1	3	60	1									163.20		680.00
38	Flip Station 180	7560	1	1	0	60	1									163.20		680.00
39	HS-50	1500	1	1	2	60	1									163.20		680.00
40	HS-50 x 2 / SPL	1502	1	1	4	60	1									163.20		680.00
41	HS-50 x 3 / SPL	1503	1	1	6	60	1									163.20		680.00
42	Last Lift	7500	0	0	0	60	1									163.20		680.00
43	Magazine Buffer MB100	7320	0	0	0	60	1									163.20		680.00
44	Magazine Buffer MB50	7310	0	0	0	60	1									163.20		680.00
45	Magazine Loader ML02	7600	1	1	0	60	1									163.20		680.00
46	Magazine Loader ML05	7610	1	1	0	60	1									163.20		680.00
47	Magazine Unloader MU02	7601	1	1	0	60	1									163.20		680.00
48	Magazine Unloader MU05	7611	1	1	0	60	1									163.20		680.00
49	Printer pro-flow	9003	1	0	1	60	1									163.20		680.00
50	Printer pro-flow temp control	9004	1	0	1	60	1									163.20		680.00
51	Printer squeegee operation	9001	1	0	1	60	1									163.20		680.00
52	Printer squeegee operation temp control	9002	1	0	1	60	1									163.20		680.00
53	RX 261	8001	1	1	1	60	1									163.20		680.00
54	RX 262	8002	1	1	1	60	1									163.20		680.00
55	RX 331	8003	1	1	1	60	1									163.20		680.00
56	RX 332	8004	1	1	1	60	1									163.20		680.00
57	RX 411	8005	1	1	1	60	1									163.20		680.00
58	RX 412	8006	1	1	1	60	1									163.20		680.00
59	S-20	1200	1	1	1	60	1									163.20		680.00
60	S-23	1230	1	1	1	60	1									163.20		680.00
61	S-25	1250	1	1	1	60	1									163.20		680.00
62	Shuttle - 1 lane to 2 lane	7100	0	0	0	60	1									163.20		680.00
63	Shuttle - 2 lane to 1 lane	7200	0	0	0	60	1									163.20		680.00
64	Telescopic Gate TG	7550	1	1	0	60	1									163.20		680.00
65	Turn Station TS	7570	1	1	0	60	1									163.20		680.00
66																		680.00
67																		680.00
68																		680.00

FIG. 7B

TOTAL = 626,350

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
69																163.20		680.00
70																163.20		680.00
71																163.20		680.00
72																163.20		680.00
73																163.20		680.00
74																163.20		680.00
75																163.20		680.00
76																163.20		680.00
77																163.20		680.00
78																163.20		680.00
79																163.20		680.00
80																163.20		680.00
81																163.20		680.00
82																163.20		680.00
83																163.20		680.00
84																163.20		680.00
85																163.20		680.00
86																163.20		680.00
87																163.20		680.00
88																163.20		680.00
89																163.20		680.00
90																163.20		680.00
91																163.20		680.00
92																163.20		680.00
93																163.20		680.00
94																163.20		680.00
95																163.20		680.00
96																163.20		680.00
97																163.20		680.00
98																163.20		680.00
99																163.20		680.00

FIG. 7C

Table 1. Demographic characteristics of the study population	
Age (years)	65.0 ± 1.5
Gender	
Male	50.0%
Female	50.0%
Education (years)	12.0 ± 1.0
Income (USD/month)	1,200 ± 100
Marital status	
Married	70.0%
Single	30.0%
Health status	
Good	80.0%
Poor	20.0%
Smoking status	
Smoker	30.0%
Non-smoker	70.0%
Alcohol consumption	
Drinker	20.0%
Non-drinker	80.0%
Comorbidities	
Hypertension	40.0%
Diabetes	20.0%
Heart disease	10.0%
Stroke	5.0%
Arthritis	30.0%
Chronic kidney disease	15.0%
Chronic liver disease	10.0%
Chronic lung disease	15.0%
Chronic pain	25.0%
Chronic mental health issues	10.0%
Chronic infections	5.0%
Chronic drug use	10.0%
Chronic alcohol use	5.0%
Chronic tobacco use	5.0%
Chronic cannabis use	5.0%
Chronic opioid use	5.0%
Chronic benzodiazepine use	5.0%
Chronic antidepressant use	5.0%
Chronic antipsychotic use	5.0%
Chronic mood stabilizer use	5.0%
Chronic immunosuppressant use	5.0%
Chronic chemotherapy use	5.0%
Chronic radiation therapy use	5.0%
Chronic hormone therapy use	5.0%
Chronic enzyme replacement therapy use	5.0%
Chronic gene therapy use	5.0%
Chronic cell therapy use	5.0%
Chronic organ transplant use	5.0%
Chronic stem cell therapy use	5.0%
Chronic gene editing use	5.0%
Chronic CRISPR use	5.0%
Chronic mRNA vaccine use	5.0%
Chronic protein vaccine use	5.0%
Chronic DNA vaccine use	5.0%
Chronic viral vaccine use	5.0%
Chronic bacterial vaccine use	5.0%
Chronic fungal vaccine use	5.0%
Chronic parasitic vaccine use	5.0%
Chronic cancer vaccine use	5.0%
Chronic autoimmune vaccine use	5.0%
Chronic infectious disease vaccine use	5.0%
Chronic neurological vaccine use	5.0%
Chronic cardiovascular vaccine use	5.0%
Chronic respiratory vaccine use	5.0%
Chronic musculoskeletal vaccine use	5.0%
Chronic dermatological vaccine use	5.0%
Chronic ophthalmological vaccine use	5.0%
Chronic otolaryngological vaccine use	5.0%
Chronic urological vaccine use	5.0%
Chronic gynecological vaccine use	5.0%
Chronic pediatric vaccine use	5.0%
Chronic geriatric vaccine use	5.0%
Chronic immunodeficiency vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	5.0%
Chronic immunotolerance vaccine use	5.0%
Chronic immunoprotection vaccine use	5.0%
Chronic immunosuppression vaccine use	5.0%
Chronic immunomodulation vaccine use	5.0%
Chronic immunoregulation vaccine use	

[illegible]

FIG. 7D

	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
33																
34	4080.00	8160.00			600	0				S25Cluster2 L1	S25Cluster2	Lift1	450			
35	4080.00	8160.00			900	0				S25Cluster3 L1	S25Cluster3	Lift1	875			
36	4080.00	8160.00			200	0				S25 L1	S25	Conveyor001	200			
37	4080.00	8160.00			600	0				S25Cluster2 L1	S25Cluster2	Lift1	450			
38	4080.00	8160.00			900	0				S25Cluster3 L1	S25Cluster3	Lift1	875			
39	4080.00	8160.00			200	0				Flip Station		Printermc	200			
40	4080.00	8160.00			350	0				HS50 L1	HS50	Conveyor001	400			
41	4080.00	8160.00			900	0				HS50Cluster2 L1	HS50Cluster2L	Lift1	850			
42	4080.00	8160.00			1350	0				HS50Cluster3 L1	HS50Cluster3L	Lift1	1250			
43	4080.00	8160.00			100	0				Lastlift		Lift4	700			
44	4080.00	8160.00			150	0				Buffer Magazine100		B1	100			
45	4080.00	8160.00			150	0				Buffer Magazine50		B1	100			
46	4080.00	8160.00			200	0				Magazine Loader2		Printermc	200			
47	4080.00	8160.00			200	0				Magazine Loader5		Printermc	200			
48	4080.00	8160.00			200	0				Magazine Unloader2		Printermc	200			
49	4080.00	8160.00			200	0				Magazine Unloader5		Printermc	200			
50	4080.00	8160.00			200	0				Printer		Printermc	200			
51	4080.00	8160.00			200	0				Printer		Printermc	200			
52	4080.00	8160.00			200	0				Printer		Printermc	200			
53	4080.00	8160.00			1400	0				Oven_1Lane	Oven_2	Oven_2001	700			
54	4080.00	8160.00			1400	0				Oven_1Lane	Oven_2	Oven_2001	700			
55	4080.00	8160.00			1400	0				Oven_1Lane	Oven_2	Oven_2001	700			
56	4080.00	8160.00			1400	0				Oven_1Lane	Oven_2	Oven_2001	700			
57	4080.00	8160.00			1400	0				Oven_1Lane	Oven_2	Oven_2001	700			
58	4080.00	8160.00			1400	0				S25 L1	S25	Conveyor001	200			
59	4080.00	8160.00			200	0				S25 L1	S25	Conveyor001	200			
60	4080.00	8160.00			200	0				S25 L1	S25	Conveyor001	200			
61	4080.00	8160.00			200	0				Shuttle1_2		Shuttle	100			
62	4080.00	8160.00			100	0				Shuttle2_1		Shuttle	100			
63	4080.00	8160.00			100	0				ConvTG		conv5_2001	150			
64	4080.00	8160.00			150	0				Turn Station		Printermc	200			
65	4080.00	8160.00			200	0										
66	4080.00	8160.00														
67	4080.00	8160.00														
68	4080.00	8160.00														

FIG. 7E

	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
69		4080.00		8160.00												
70		4080.00		8160.00												
71		4080.00		8160.00												
72		4080.00		8160.00												
73		4080.00		8160.00												
74		4080.00		8160.00												
75		4080.00		8160.00												
76		4080.00		8160.00												
77		4080.00		8160.00												
78		4080.00		8160.00												
79		4080.00		8160.00												
80		4080.00		8160.00												
81		4080.00		8160.00												
82		4080.00		8160.00												
83		4080.00		8160.00												
84		4080.00		8160.00												
85		4080.00		8160.00												
86		4080.00		8160.00												
87		4080.00		8160.00												
88		4080.00		8160.00												
89		4080.00		8160.00												
90		4080.00		8160.00												
91		4080.00		8160.00												
92		4080.00		8160.00												
93		4080.00		8160.00												
94		4080.00		8160.00												
95		4080.00		8160.00												
96		4080.00		8160.00												
97		4080.00		8160.00												
98		4080.00		8160.00												
99		4080.00		8160.00												

FIG. 7F

	A	B	C	D	E	F	G	H	I	J	K	L	M
	</												

	N	O	P	Q	R	S	T	U	V	W	X	Y
1												
2	10	11	12	13	14	15	16	17	18	19	20	21
3												
4												
5												
6												
7												
8												
9												
10												
11												
12	999	999	999	999	999	999	999	999	999	999	999	999
13	999	999	999	999	999	999	999	999	999	999	999	999
14	999	999	999	999	999	999	999	999	999	999	999	999

FIG. 8A

	Z	AA	AB	AC	AD	AE	AF	AG	AH
1									
2	22	23	24	25	26	27	28	29	30
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13	999	999	999	999	999	999	999	999	999
14	999	999	999	999	999	999	999	999	999

FIG. 8B

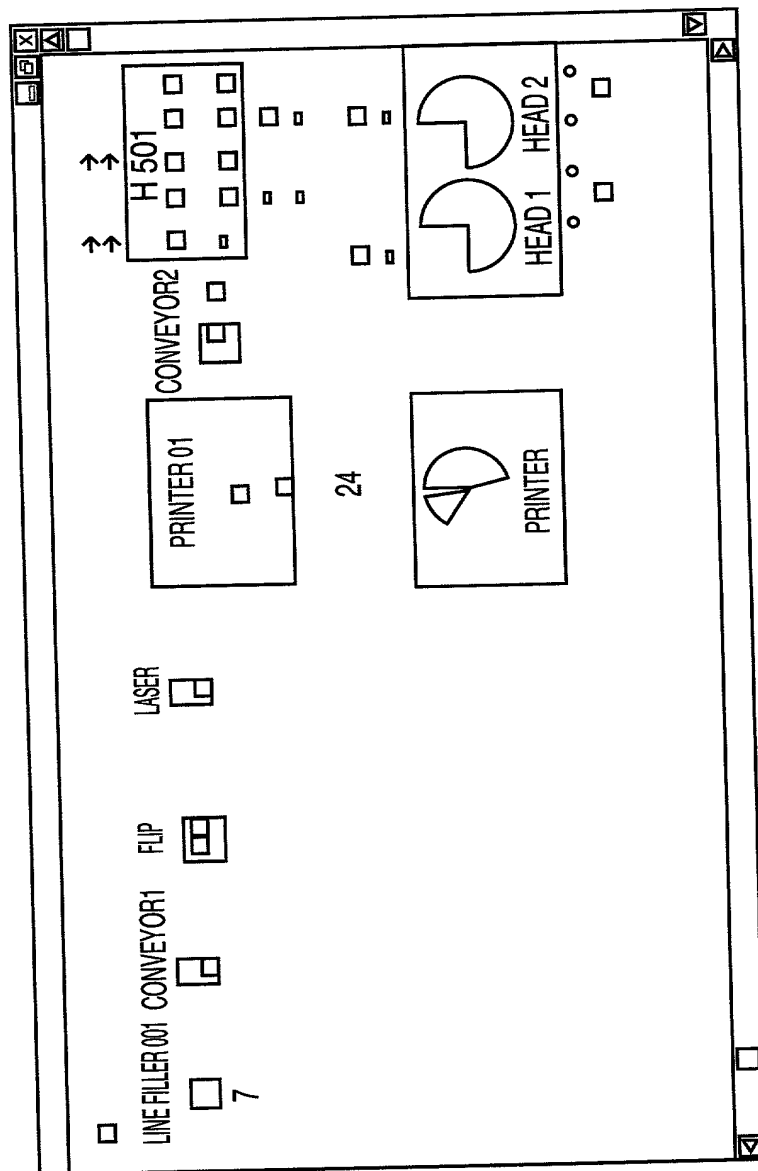


FIG. 9

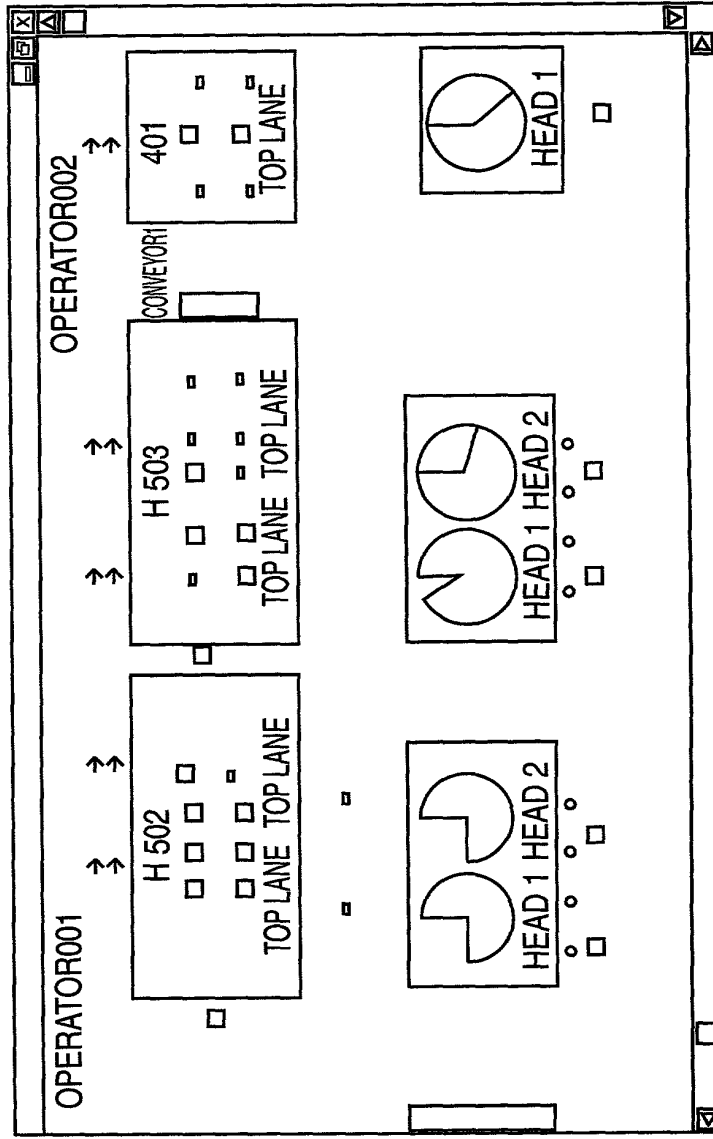


FIG. 9A

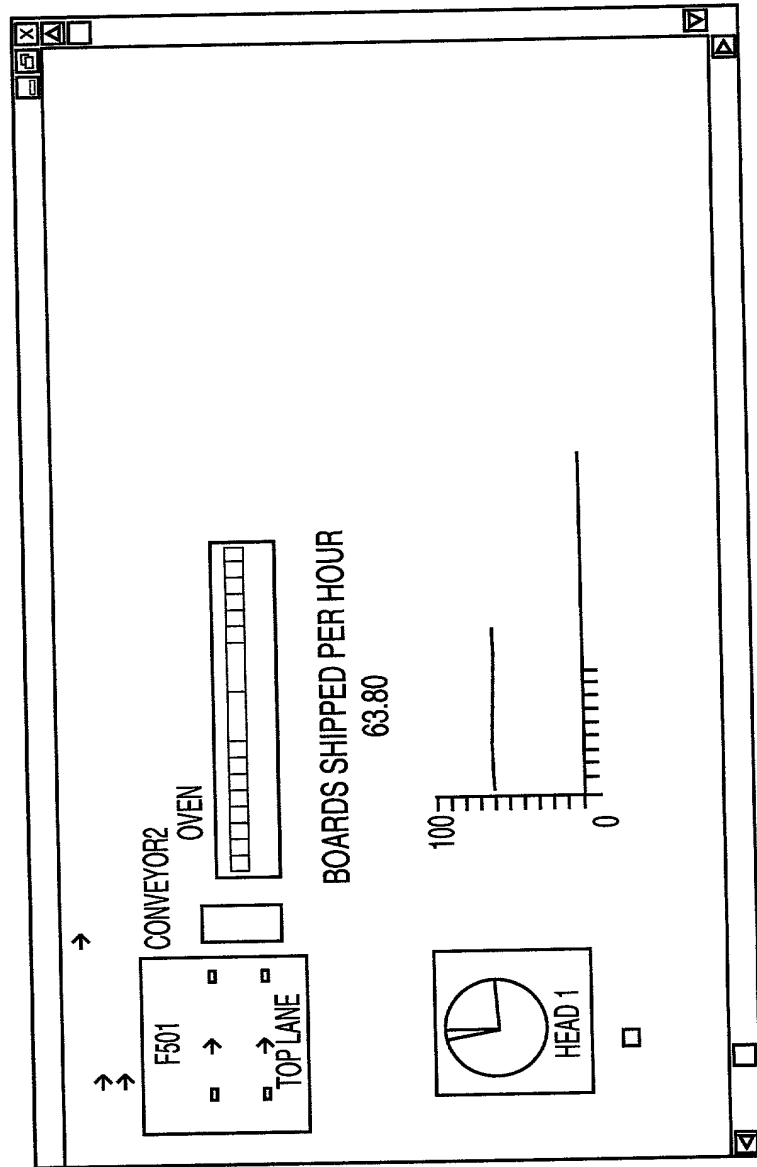


FIG. 9B

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

Graphs

Cost of Ownership

Machine Statistics

Sheets

Boundaries

Setup

Quality

Maintenance

Summary

FIG. 10

	A	B	C	D	E	F	G
	Boundaries						
1	Project	Test1					
2	Date	31/March 2001					
3							
4							
5							
6	Financial						
7	Currency (Input)						
8	Currency (Output)						
9	Exchang ratio (In/Out)						
10	Depreciation						
11	Interest Rate						
12	Labor						
13	Operator						
14	Supervisor						
15	Maintenance						
16	Rework						
17	Utilities						
18	floor space (year/spm)						
19	electricity (kWh)						
20	Nitrogen (???)						
21	air (???)						
22							
23							
24							
25							
26							

Main

FIG. 11

	A	B	C	D	E	F	G
	Setup						
1							
2							
3	internal setup						
4	Operator labor per hour	0.00	hours				
5	setup changes every x h						
6	# of setup changes per week	0	min.				
7	setup changes per year						
8	time per setup	0.00	hours				
9	setup time per year	0					
10	internal setup costs						
11	external setup						
12	external setup labour per hour		minutes per setup				
13	external setup	0.00	hours				
14	external setup per year						
15	Investment for external setup						
16							
17							
18	external setup costs per year	0					
19							
20	setup costs	0					
21							

Main

FIG. 12

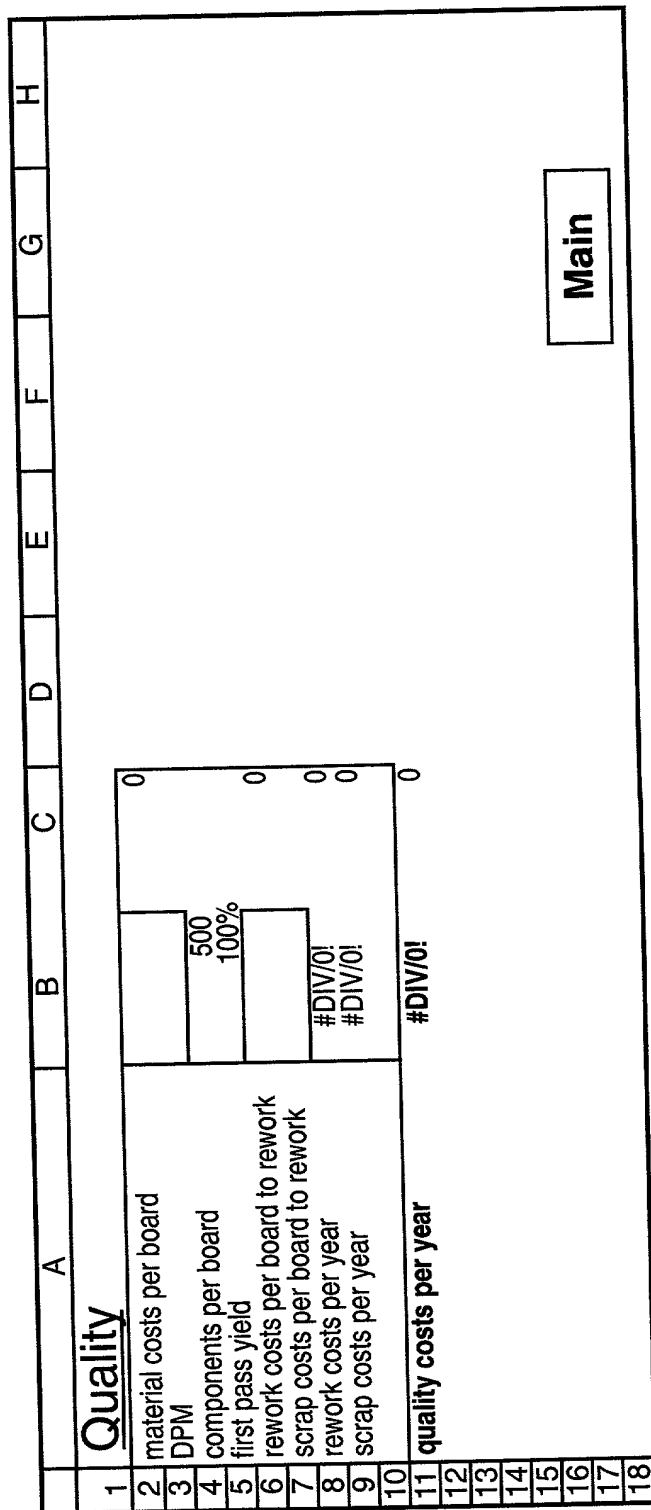


FIG. 13

	A	B	C	D	E	F	G	H	I
			minutes	# of workers	who does maint.	downtime factor	line operator (h)	maint. team (h)	downtime (h)
1	Maintenance								
2	line workers			0					
3	maintenance per shift (min)			1	100%		0.00	0.00	#DIV/0!
4	maintenance weekly (min)			1	100%		0.00	0.00	#DIV/0!
5	maintenance monthly add. (min)			2	100%		#DIV/0!	#DIV/0!	#DIV/0!
6	maintenance quarterly add (min)			3	100%		0.00	0.00	#DIV/0!
7	maintenance every x h add (min)	10,000		3	100%		0.00	0.00	#DIV/0!
8	maintenance time calculated (h)						#DIV/0!	#DIV/0!	#DIV/0!
9	labor costs						#DIV/0!	#DIV/0!	0
10									
11	maintenance costs per year							#DIV/0!	0.000000 €
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

Main

FIG. 14

		A	B	C	D	E	F	F	H	I	J	K
		Cost of Ownership										
		Cost per year					Cost per board		Capacity			
									%			
1	Investment											
2	investment											
3	spareparts											
4	service											
5												
6												
7												
8	Labor											
9	Operations											
10	Supervisor											
11												
12												
13	Misc.											
14	Setup											
15	Maintenance											
16												
17												
18	Utilities											
19	Floorspace											
20	Electricity											
21	Nitrogen											
22	Air											
23												
24												
25	Quality											
26	rework costs per year											
27	scrap costs per year											
28												
29												
30												
31	Costs per year											

FIG. 15

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2														
3														
4														
5														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														

UTILITIES 9152

QUALITY

MISC 13209

LABOR 53658

INVESTMENT 127838

FIG. 16

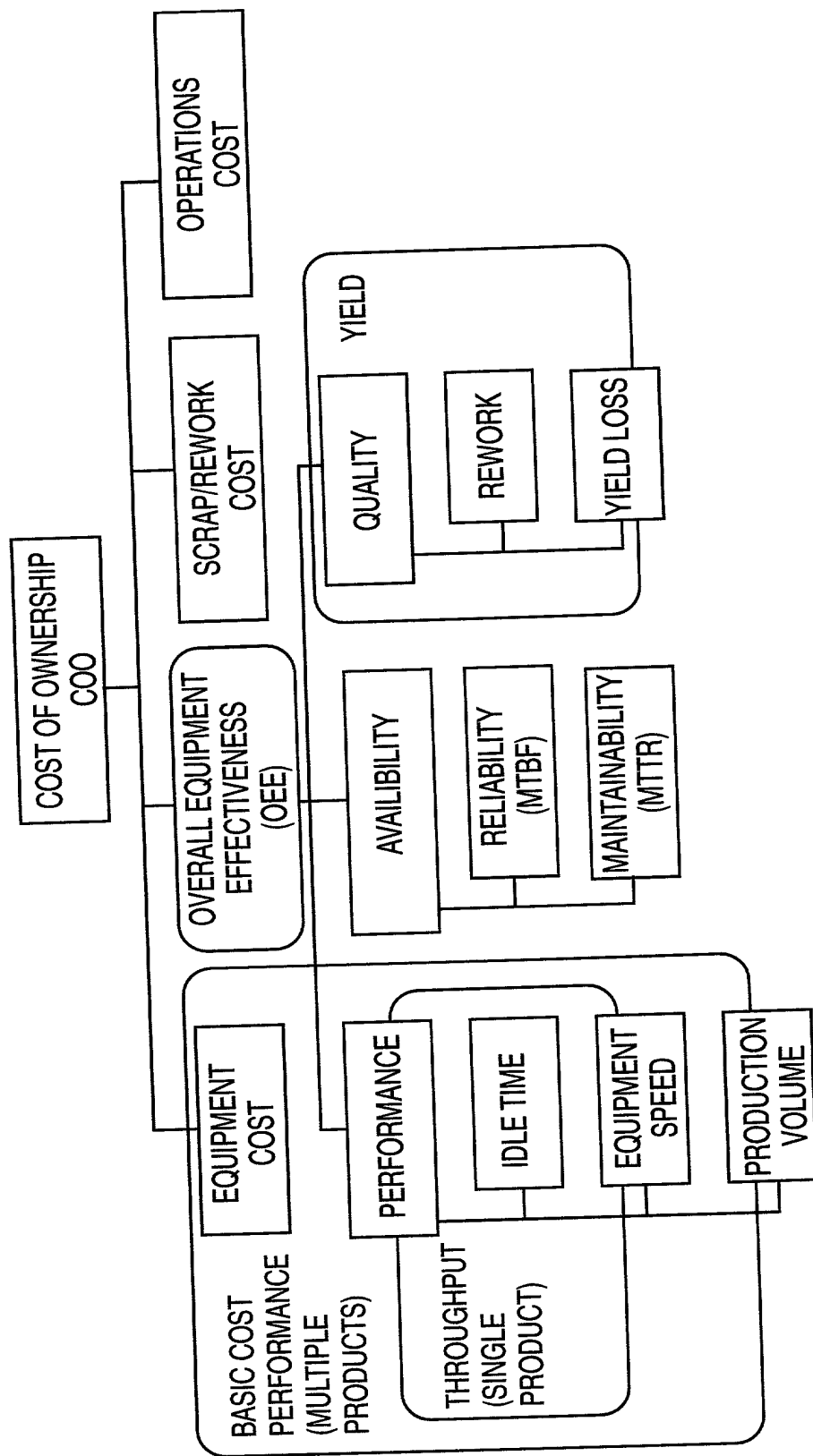


FIG. 16A

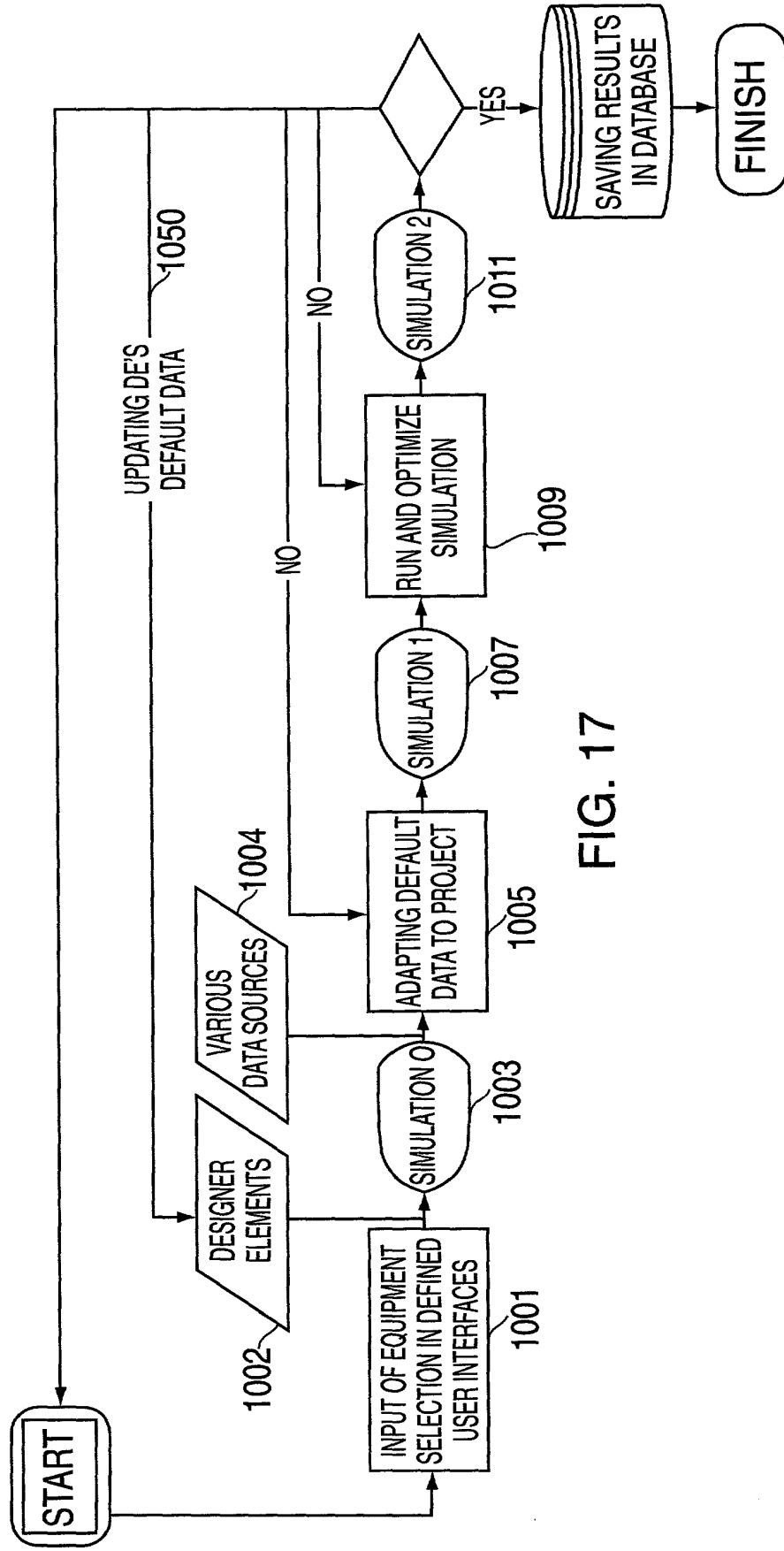


FIG. 17

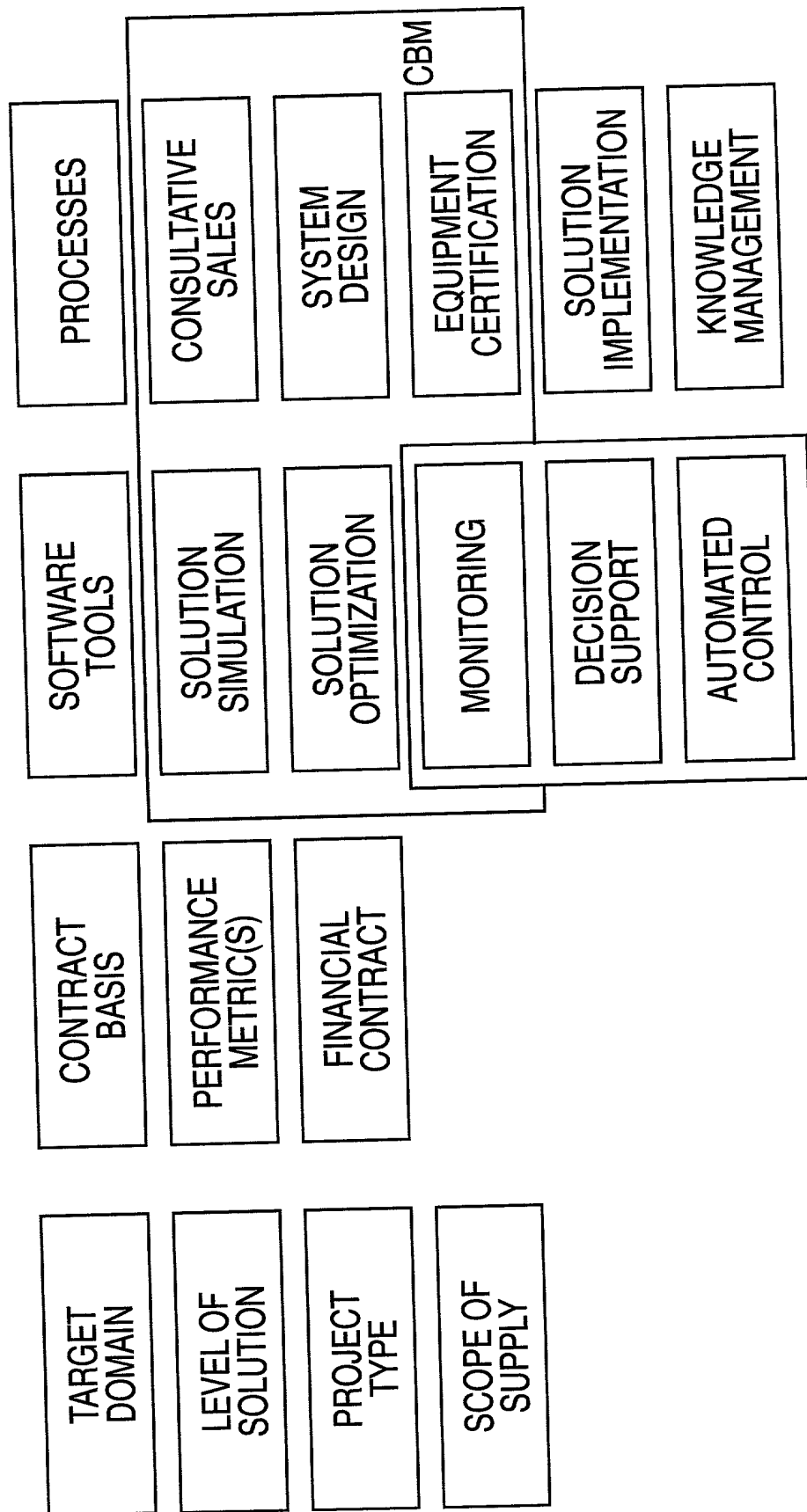


FIG. 18

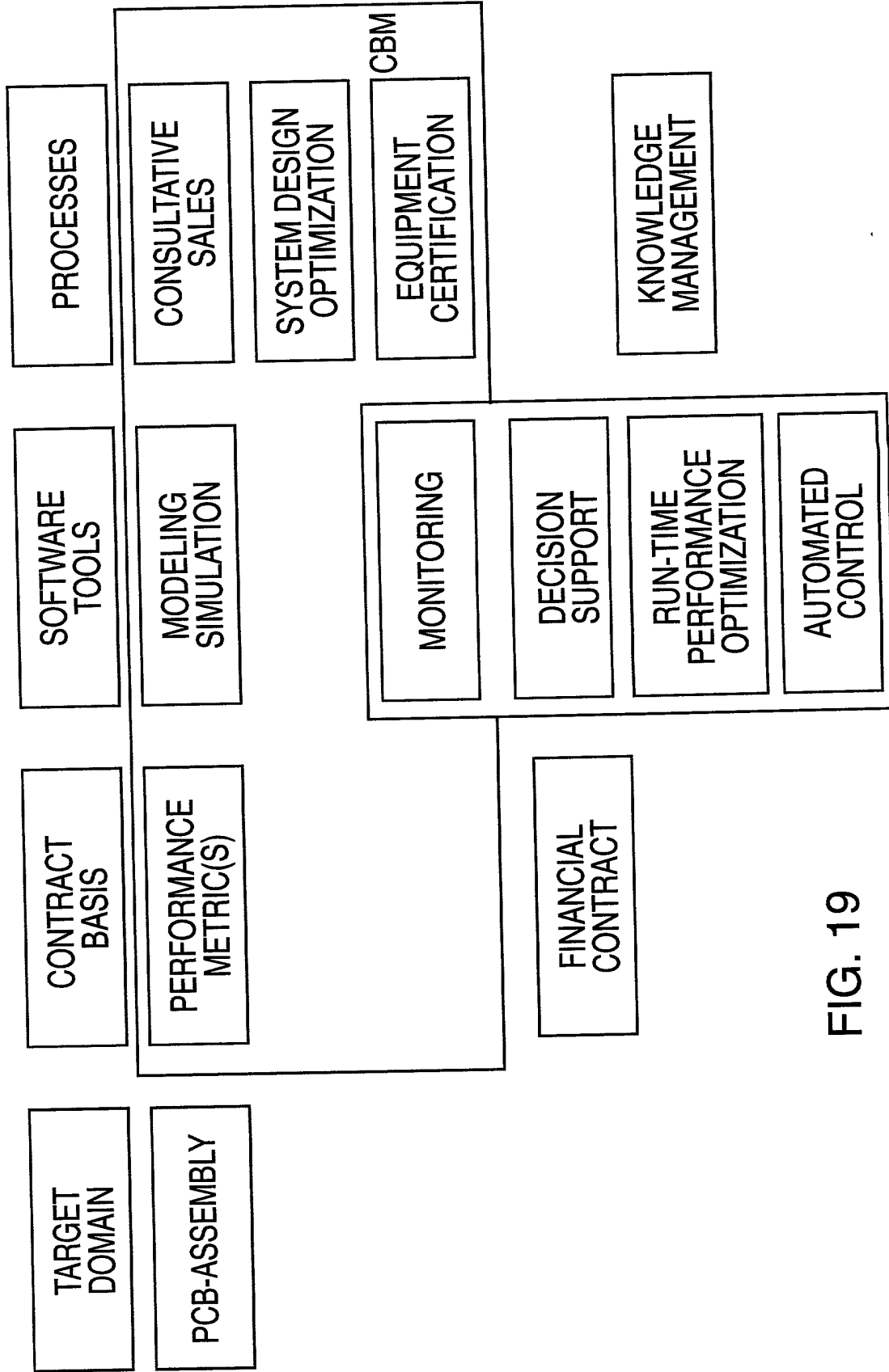


FIG. 19

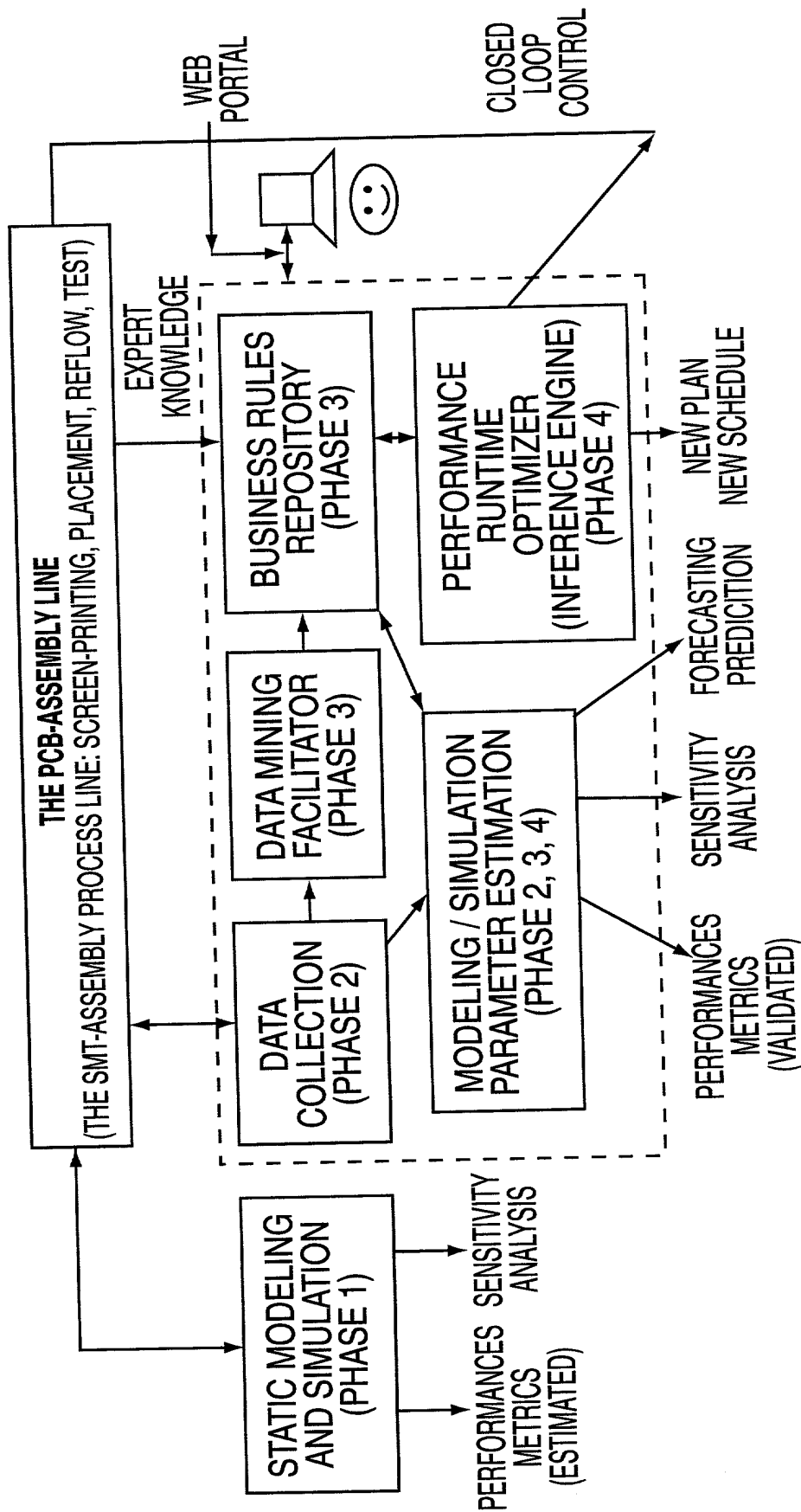


FIG. 20

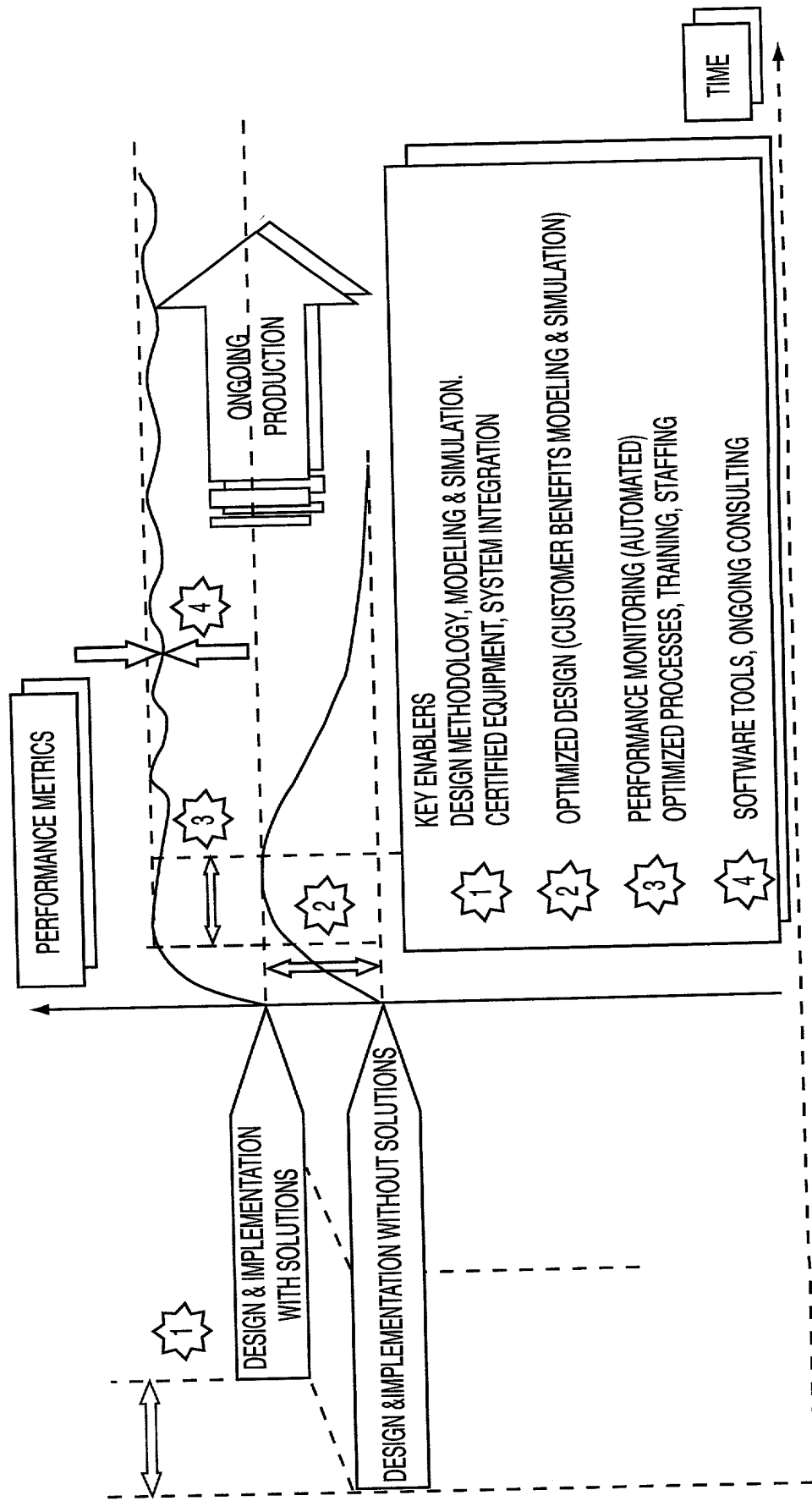


FIG. 21

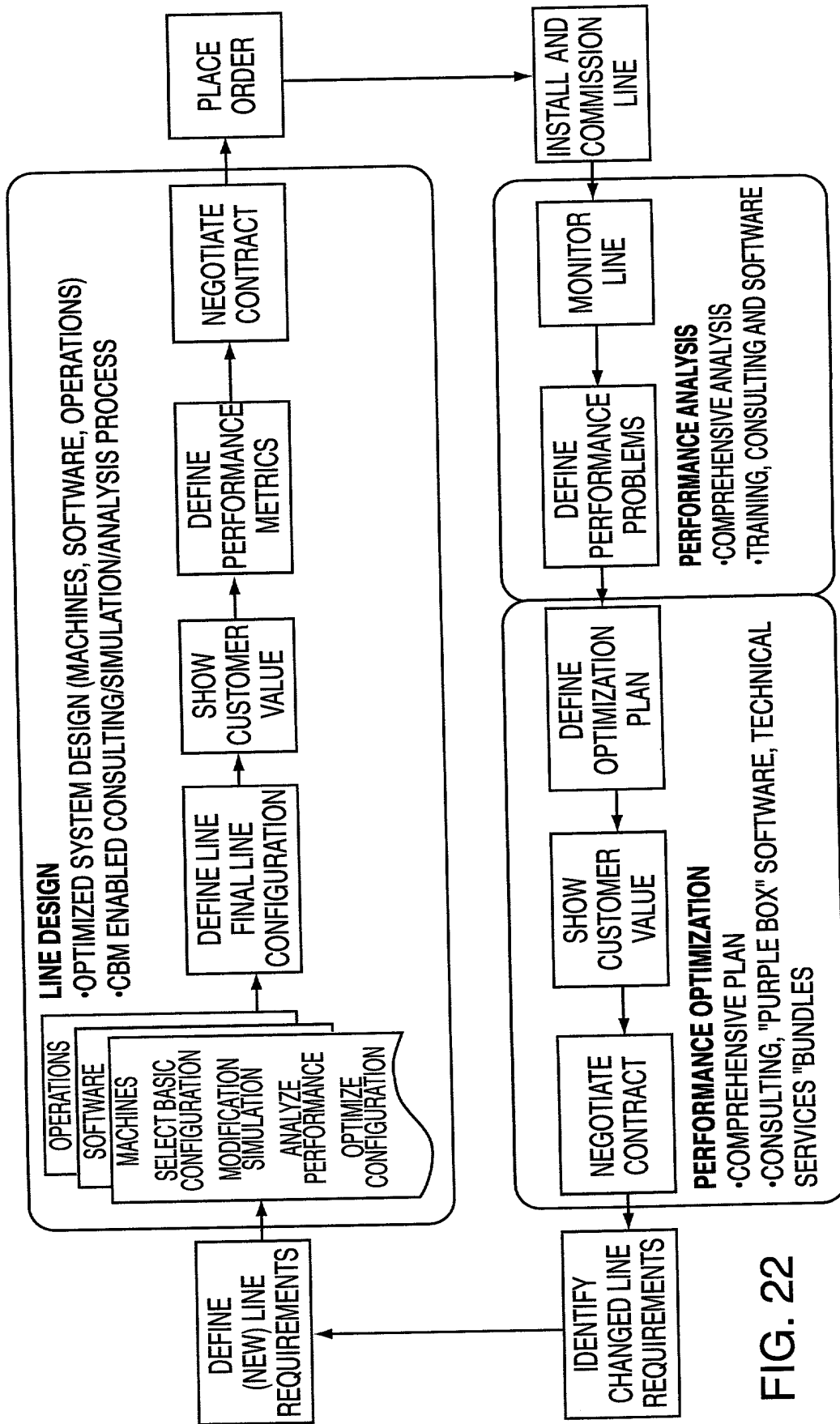


FIG. 22

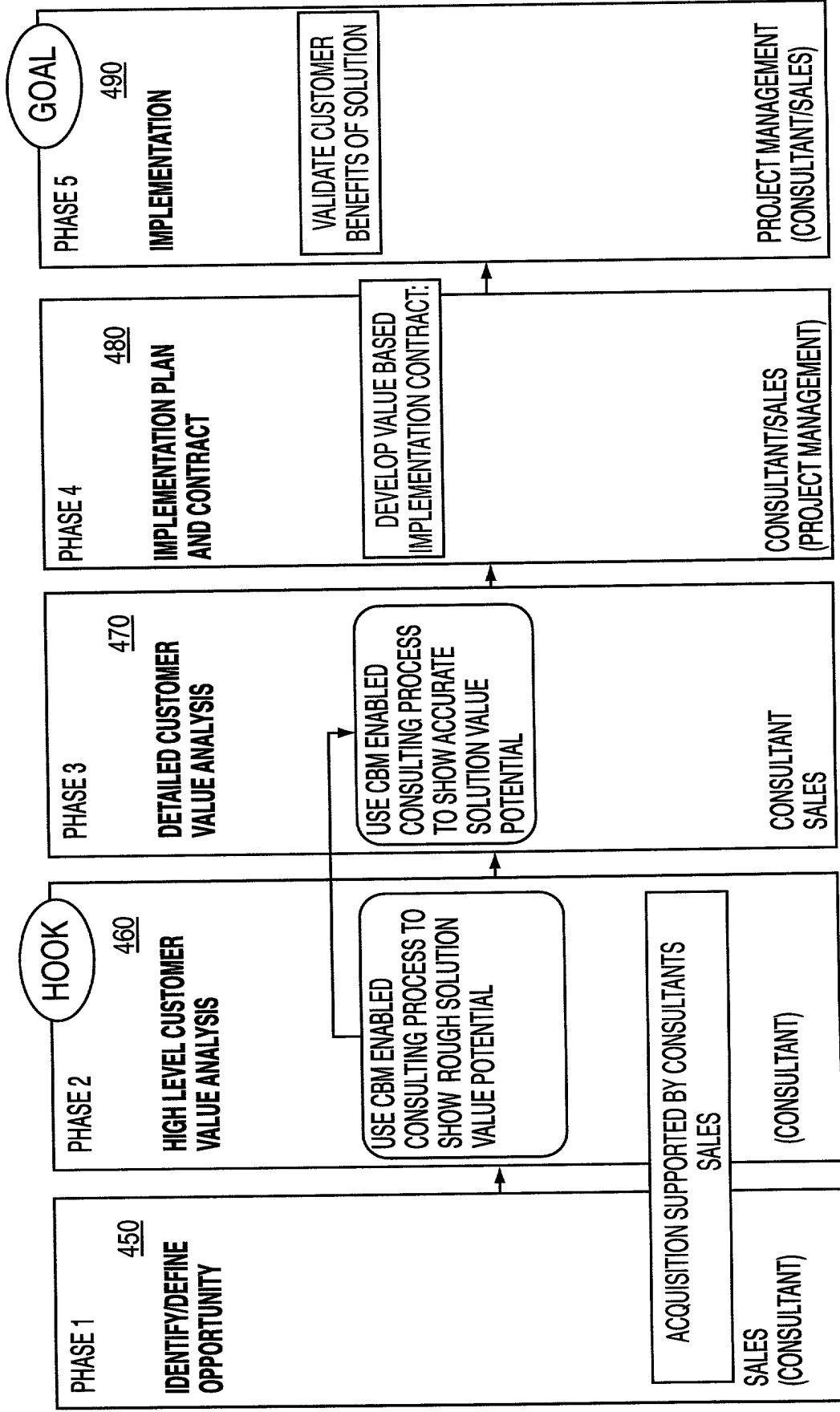


FIG. 23

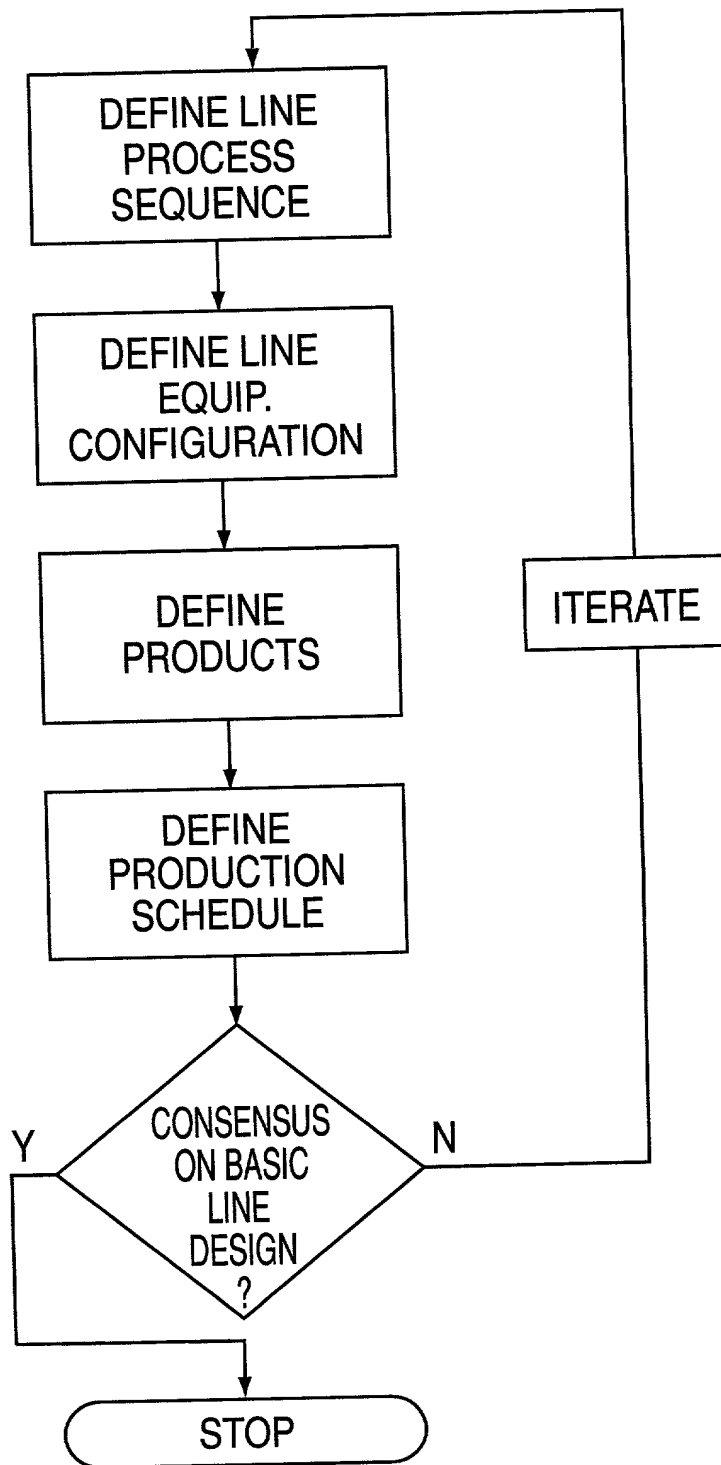


FIG. 24

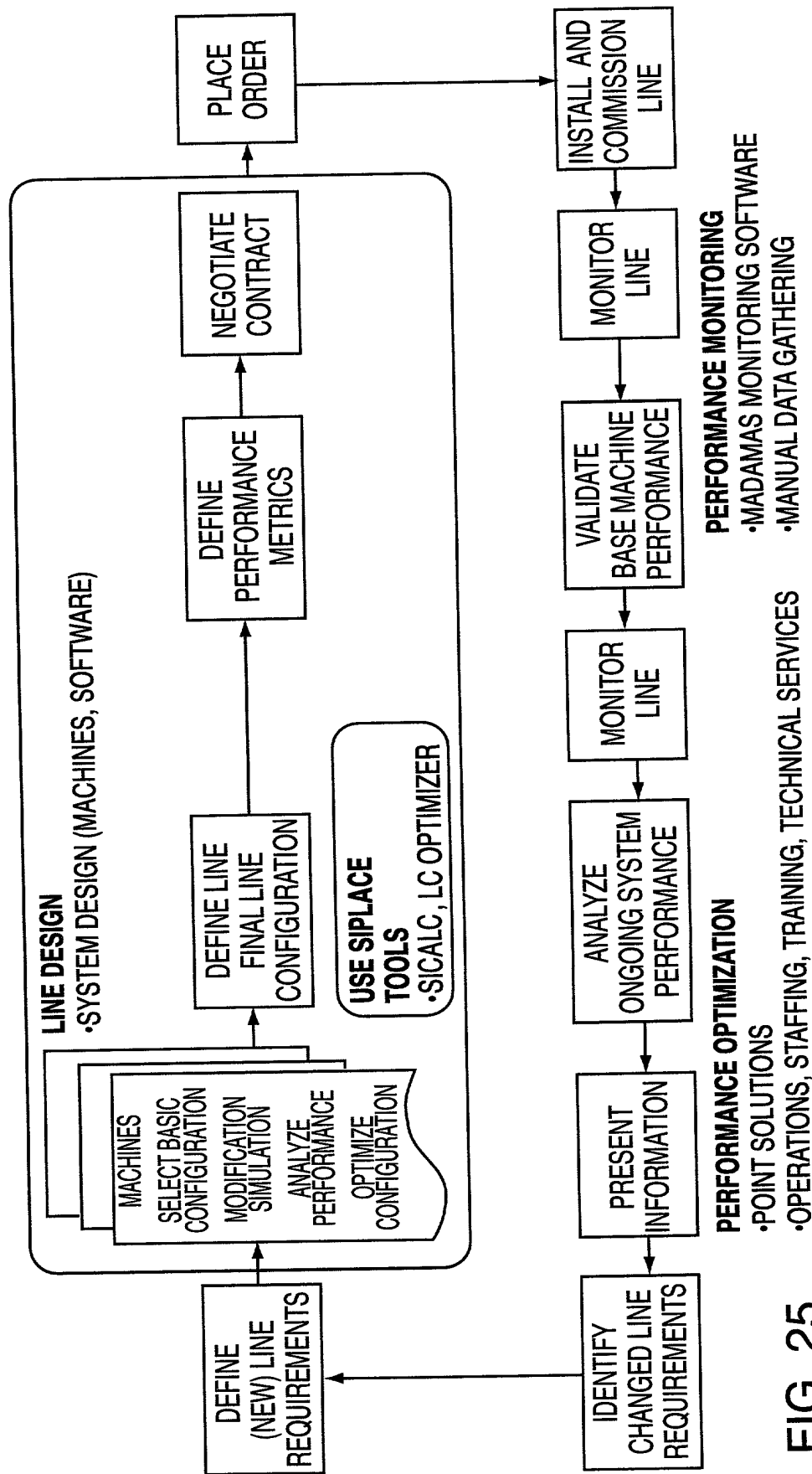
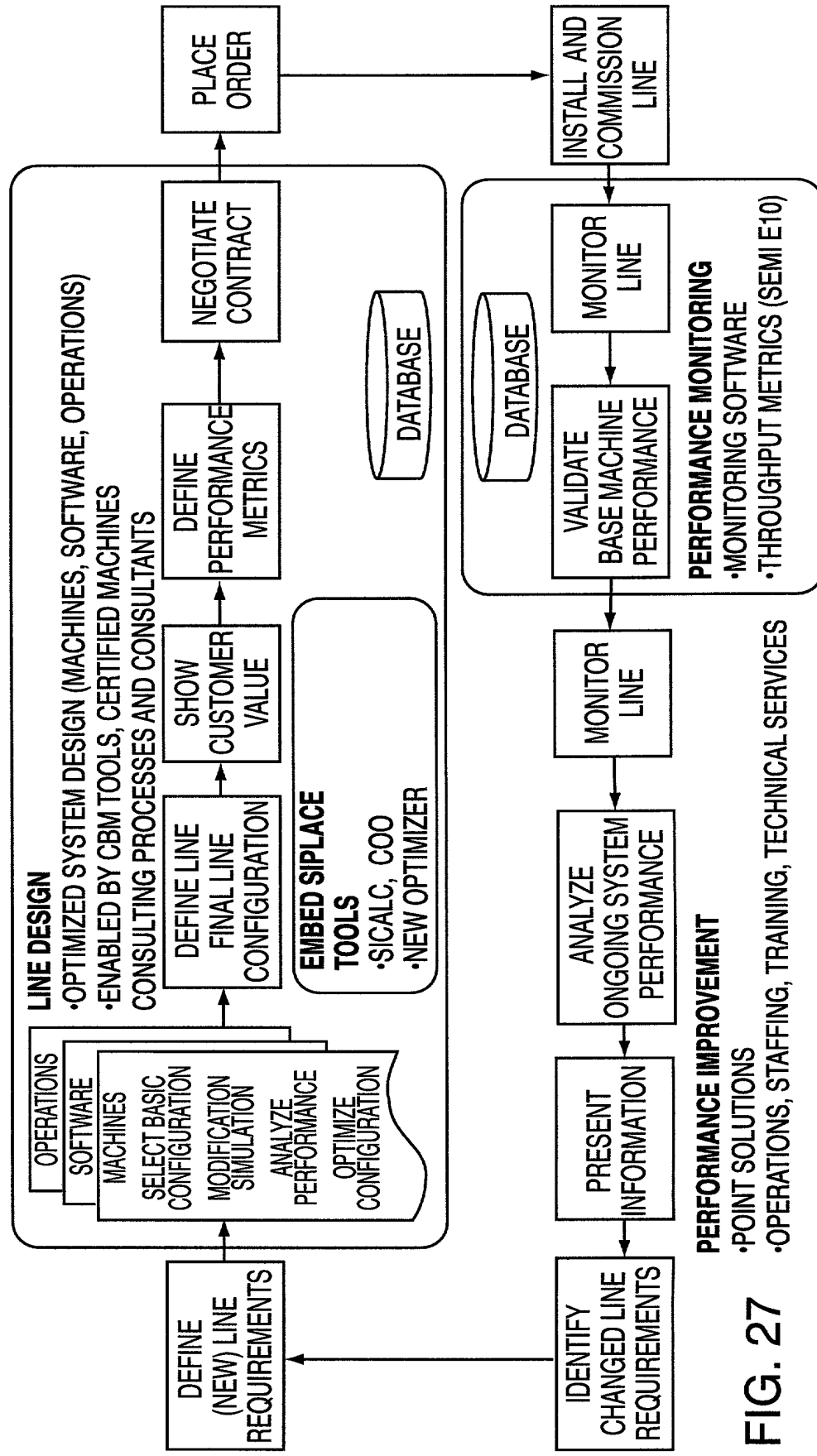
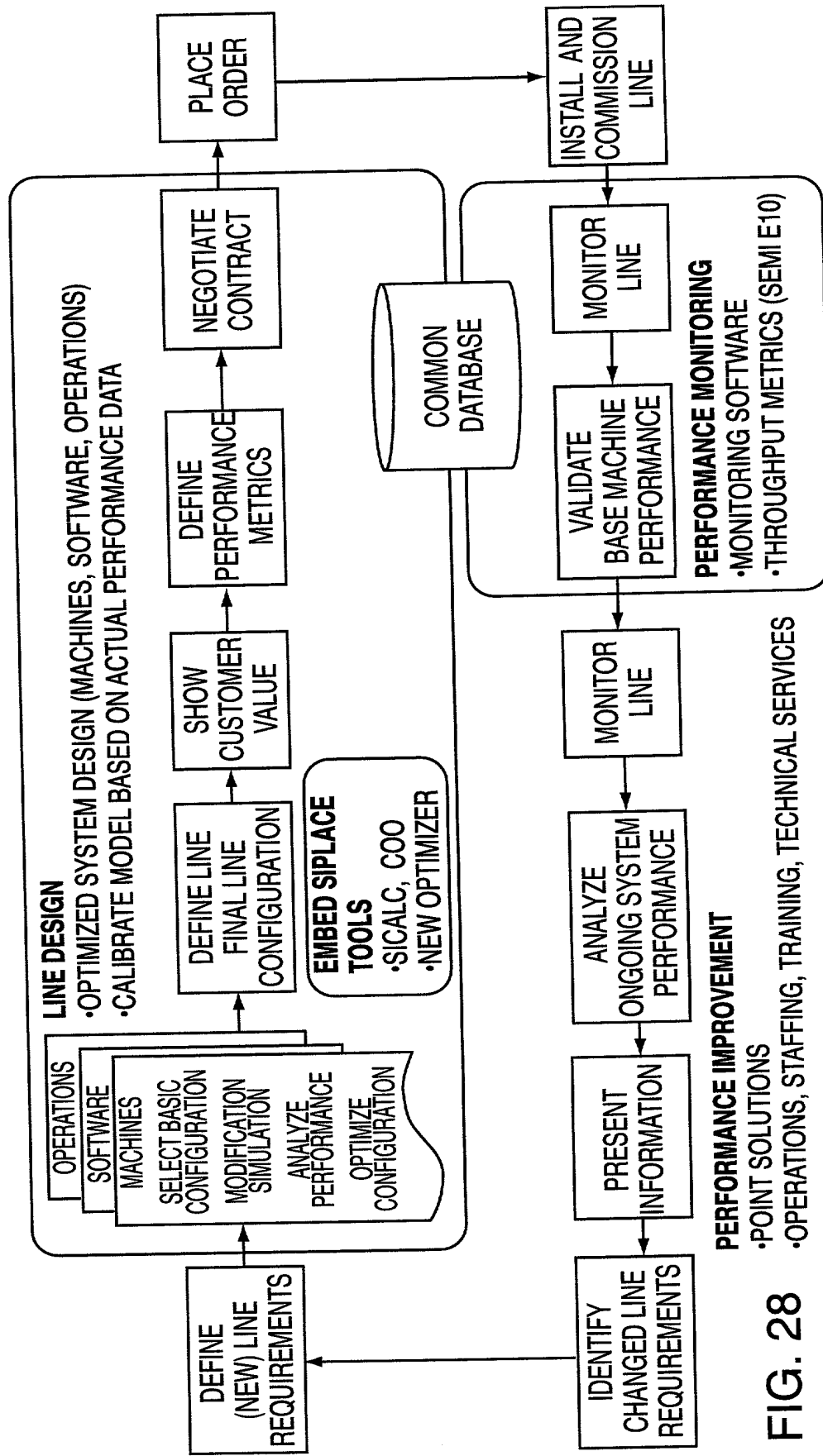


FIG. 25





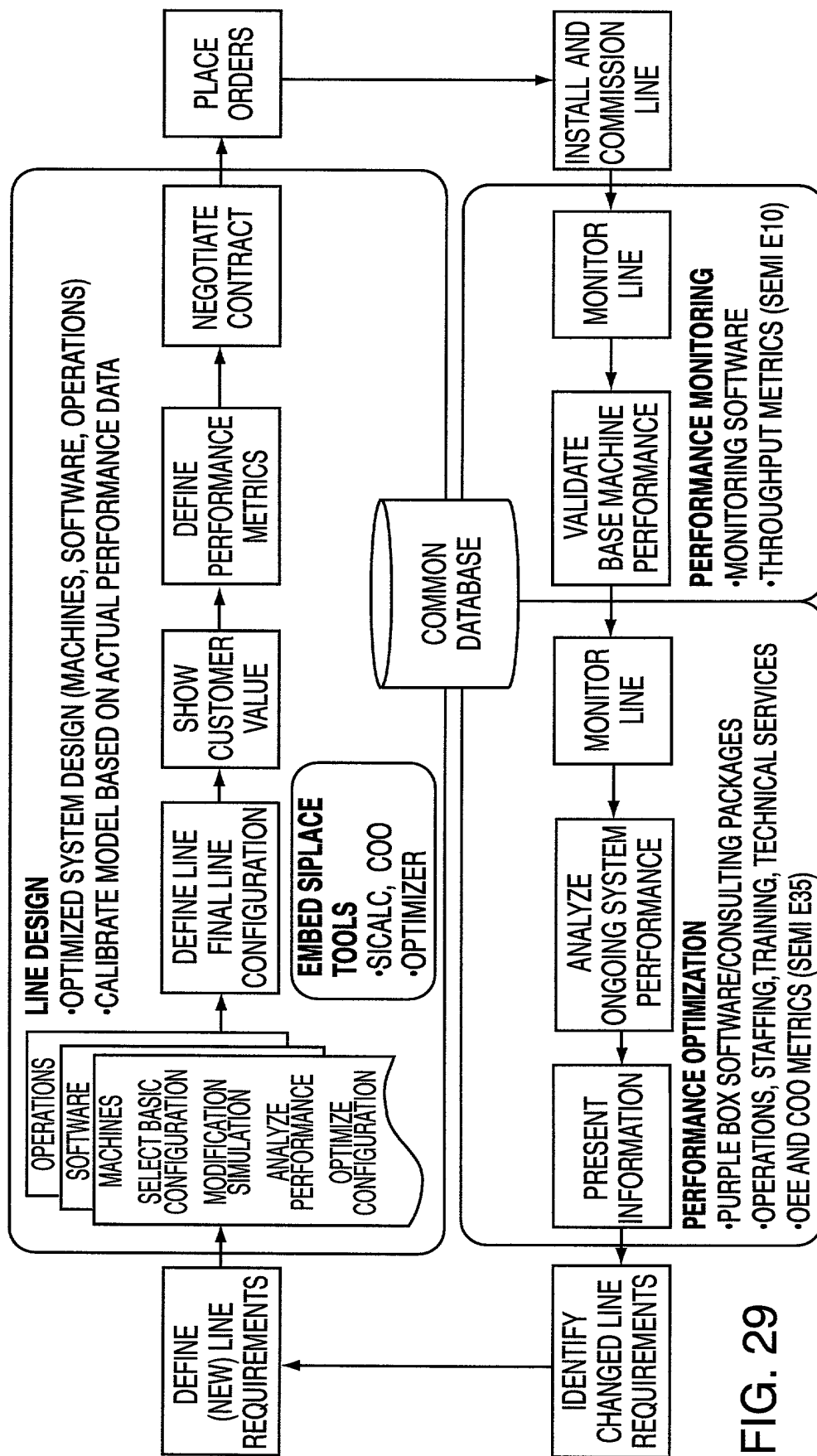


FIG. 29

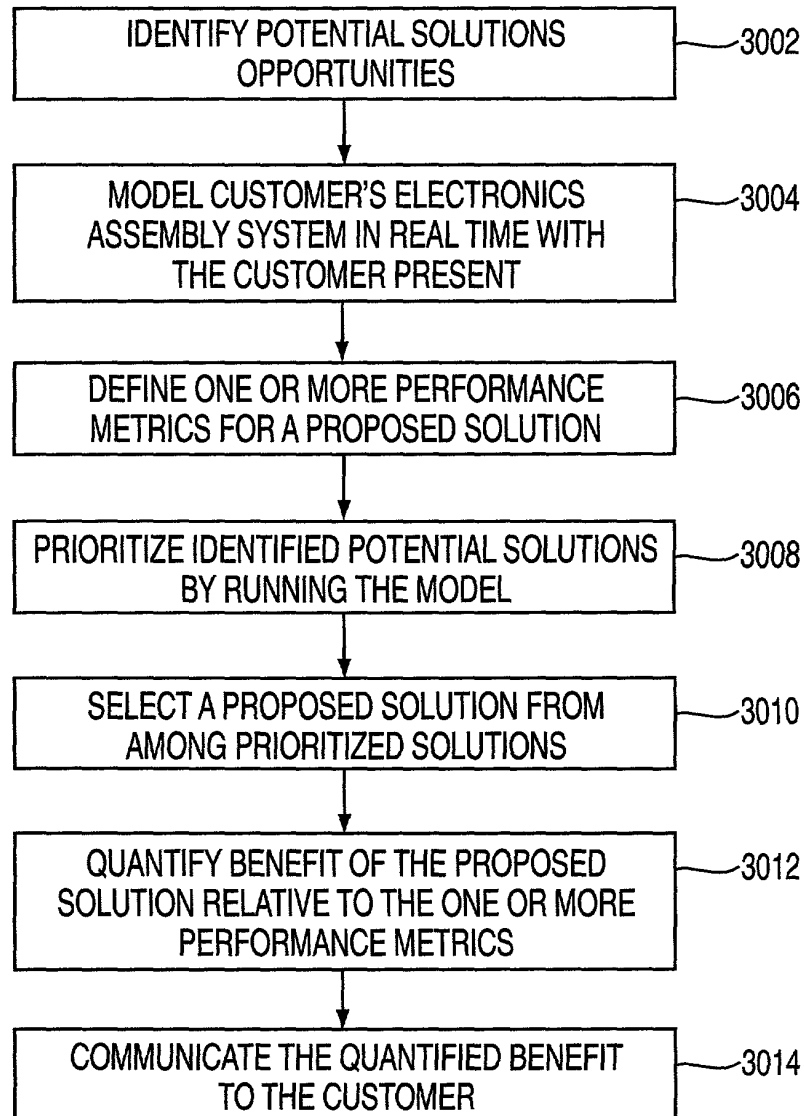


FIG. 30

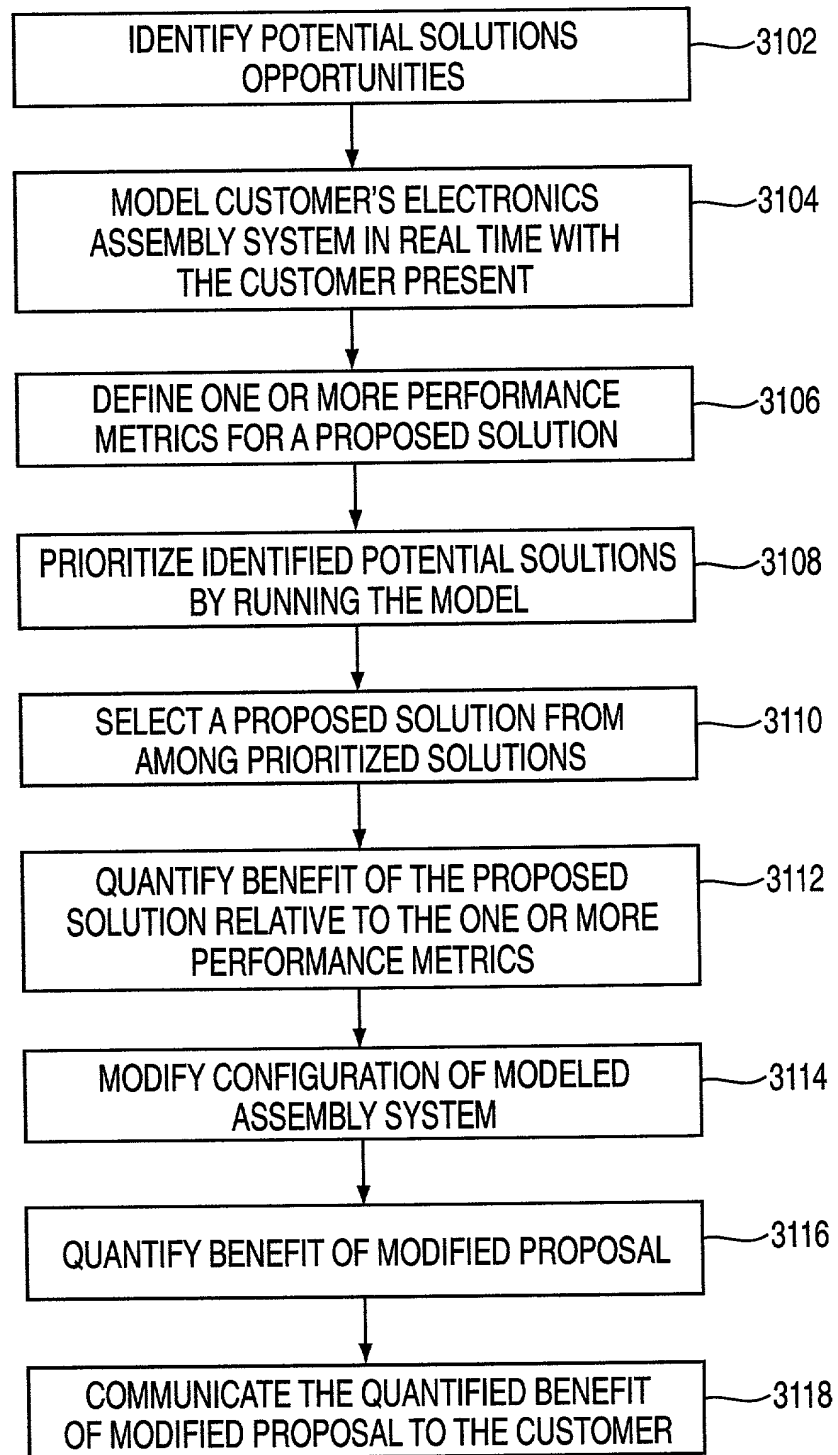


FIG. 31

IDENTIFY SET OF CUSTOMER CONSTRAINTS 3202

SELECT AN ELECTRONICS ASSEMBLY CONFIGURATION 3204

ESTABLISH A MODEL OF AN ASSEMBLY SYSTEM COMPRISING THE SELECTED CONFIGURATION 3206

RUNNING THE MODEL TO GENERATE AT LEAST ONE PERFORMANCE MEASURE 3208

COMPARING THE AT LEAST ONE PERFORMANCE MEASURE AGAINST THE CUSTOMER CONSTRAINTS 3210

DOES PERFORMANCE MEASURE SATISFY CONSTRAINTS ? 3212
N
Y

OFFER TO SELL AT LEAST A SUBSET OF ELECTRONICS ASSEMBLY CONFIGURATION 3214

END

FIG. 32

```

graph TD
    3302[ESTABLISH A MODEL OF  
AN ASSEMBLY SYSTEM HAVING PLURALITY  
OF POSSIBLE CONFIGURATIONS] --> 3304[SELECT A MEASURE OF  
PERFORMANCE FOR THE  
ASSEMBLY SYSTEM]
    3304 --> 3306[SELECT SUBSET OF PLURALITY OF  
CONFIGURATIONS FOR THE EVALUATION]
    3306 --> 3308[SELECT CRITERIA FOR COMPARISON AGAINST  
SUBSET OF CONFIGURATIONS TO BE EVALUATED]
    3308 --> 3310[RUN MODEL TO PREDICT MEASURE OF  
PERFORMANCE FOR EACH SUBSET OF  
CONFIGURATIONS TO BE EVALUATED]
    3310 --> 3312[APPLY CRITERIA TO RESULTS OF  
PREVIOUS STEP TO SELECT  
PREFERRED CONFIGURATION]
    3312 --> 3214{DOES ANY  
CONFIGURATION  
MEET  
CRITERIA  
?}
    3214 -- N --> 3306
    3214 -- Y --> END([END])
  
```

FIG. 33

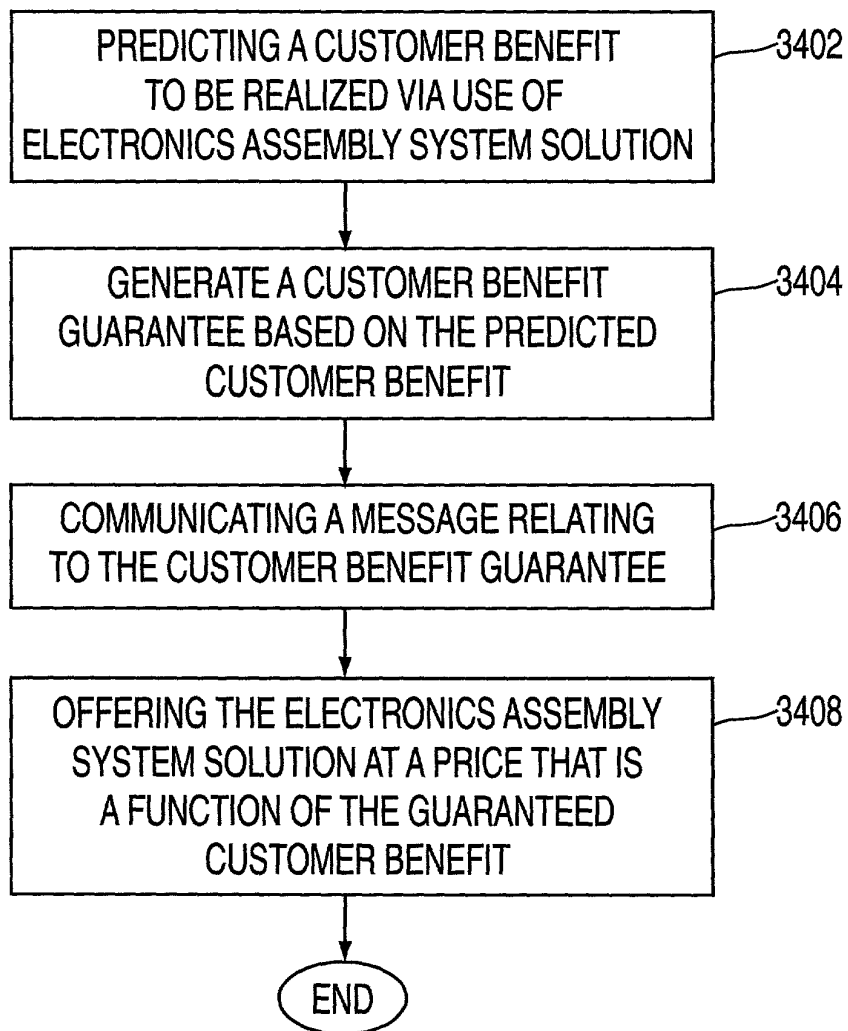


FIG. 34

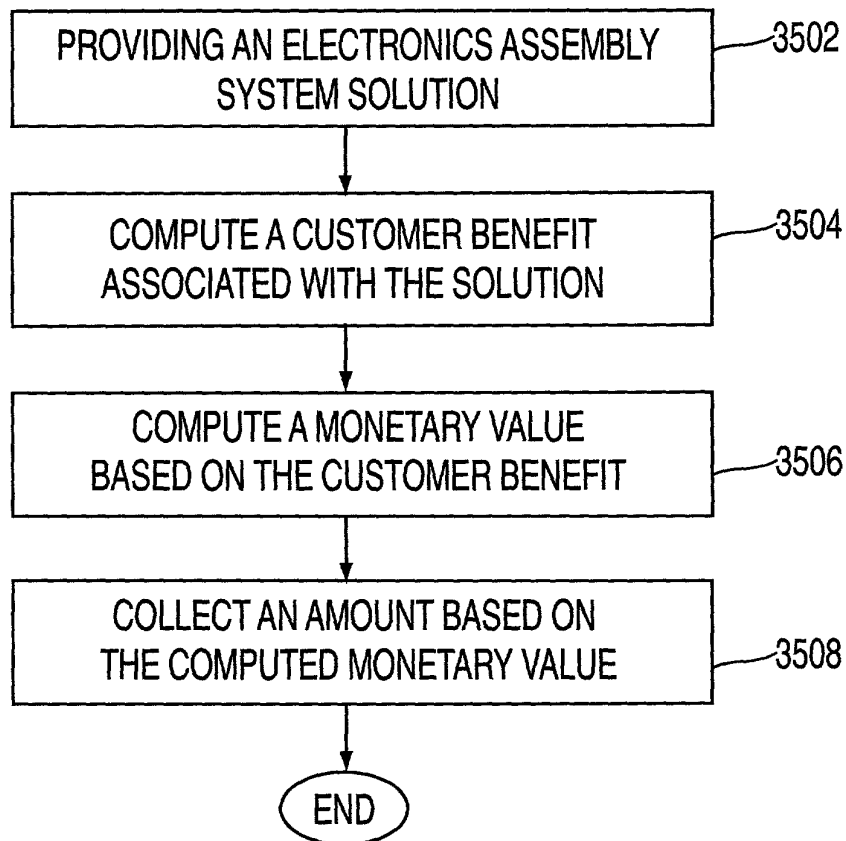


FIG. 35

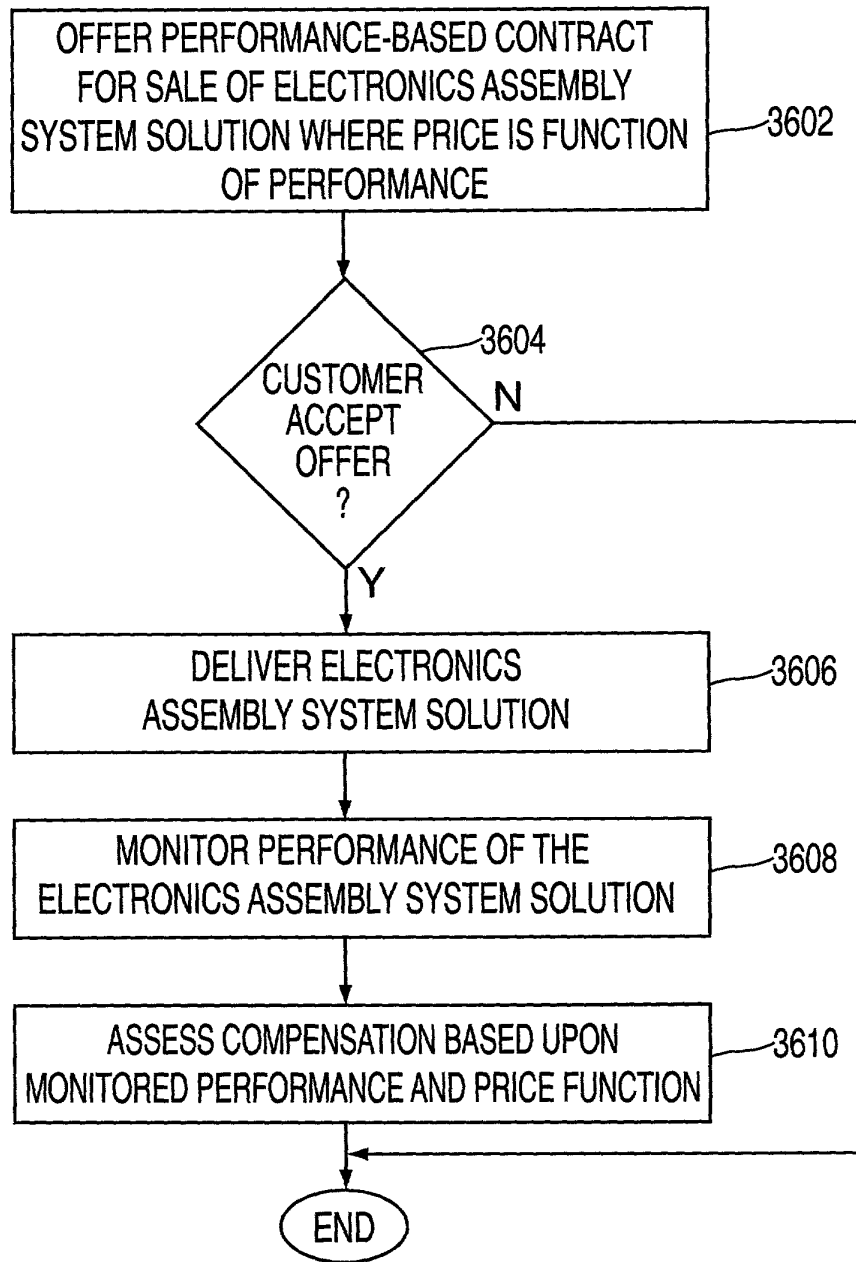


FIG. 36